OFFICE OF INSPECTOR GENERAL

FY2000 ANNUAL PLAN
BY FUNCTIONAL AREA

DETAILS ON PLANNED PROJECTS
FOR FY 2000

TABLE OF CONTENTS **PAGE**

TABLE OF CONTENTS **PAGE**

TABLE OF CONTENTS **PAGE**

TABLE OF CONTENTS **PAGE**

TABLE OF CONTENTS **PAGE**

I. ENTERPRISE: EARTH SCIENCE AND SPACE SCIENCE

A. Earth Science

Use of COTS Software in Ground Systems

OIG Program Area: Audits
Potential Locations: Goddard, Johnson

COTS ground systems software and hardware providers often claim to offer products that can be used directly out of the box, but nearly every system or component of a system must be customized to some degree to meet a mission's requirements. Every ground system must be tailored to the spacecraft it will support. The benefit to NASA in using commercial development processes to implement a system is the streamlined process allows meeting an accelerated delivery schedule, thereby cutting down development time and lowering cost. However, cutting down development time may not lower costs. Costs include acquisition and life-cycle management of the software.

NASA systems presently using or considering the use of COTS are the Hubble Space Telescope control system at Goddard; the Earth Observing System Satellite Terra, using the Raytheon Eclipse software for the ground system and the Integral Systems, Inc. COTS for analysis. Lockheed Martin Company, Houston is evaluating using COTS elements in the ground control architecture for multiple NASA satellites under the Consolidated Space Operations Contract (CSOC). Each of these systems requires some customization of the COTS product.

Objective(s)

The audit objectives will be to:

- Determine the cost effect of using COTS in a ground system and the effect on the schedule.
- Evaluate the process for determining whether to buy or build a ground system.
- Determine whether plans are in place for the time when system requirements change and the COTS company may no longer support the product or have gone out of business.

Management of Expendable Launch Vehicle Services

OIG Program Area: Audits
Potential Locations: Headquarters, Kennedy

In the last 9 months, U.S. rockets have suffered 6 serious failures, destroying or rendering useless billions of dollars worth of communications satellites, and raising concerns that

the nation lacks reliable access to Earth orbit. Although none of these failures have occurred on NASA launches, the Agency contracts for expendable launch vehicle (ELV) services with the same providers of the failed rockets. NASA's success rate in unmanned ELV procured from contractors has been 44 out of 45 launches, compared with 90 in 99 for the DoD and 75 of 82 for commercial launches. NASA attributes its success rate to more insight into the process and routine reviews by panels of outside experts.

In October 1998, NASA consolidated ELV management and acquisition of launch services at Kennedy. Estimated Fiscal Year 2000 funding requirements for ELV support is $28.6 million. Future ELV contracts will be awarded using FAR Part 12, "Acquisition of Commercial Items" as required by the Commercial Space Act of 1998 (P.L. 105-303, Section 201). FAR Part 12 will not allow NASA to maintain its current level of insight and approval.

Objective(s)

The overall audit objective will be to determine the impact of recent legislation and launch vehicle failures on NASA's successful launch rate. Specific objectives are to determine:

- NASA's role in the launch failure investigations and the findings of the investigations.
- What factors have contributed to NASA's successful launch rate.
- Whether the requirements of the Commercial Space Act of 1998 will adversely impact NASA's launch success.
- How the requirements of the Commercial Space Act of 1998 impact on the requirements of the NASA Policy Guidance (NPG) 7120.5A, "Program and Project Management Processes and Requirements."

B. Space Science

Deep Space Network Support Services

OIG Program Area: Audits
Potential Locations: JPL, Johnson

The DSN consists primarily of a control center at JPL and tracking facilities located at Goldstone, California; Canberra, Australia; and Madrid, Spain. There is also a technical support depot in Barstow, California. The DSN has approximately $2 billion of assets and an annual budget of over $100 million. The Management of the DSN has recently changed from JPL to Johnson under CSOC, which was awarded to the Lockheed. An Integrated Operations Plan (operations plan) developed under CSOC considers consolidations that would aid reducing costs. However, the Logistics Depot at Barstow,

California is still operating; and JPL is unaware of any current plans to consolidate logistics work performed at this facility in the operations plan. The operations plan may not be considering all potential activities for consolidation and, therefore, not achieving additional savings. According to JPL DSN management, a number of proposed savings under DSN have not materialized as planned.

Objective(s)

The audit objective will be to determine the need for the DSN Logistics Depot in Barstow, California, and whether Johnson has considered more cost-effective alternatives.

Space Infrared Telescope Facility Schedule and Budget Controls

OIG Program Area: Audits
Potential Locations: JPL and Contractor Locations

The Space Infrared Telescope Facility (SIRTF) is the fourth of NASA's great observatories whose purpose is to explore the nature of the cosmos through the unique windows available in the infrared portion of the electromagnetic spectrum. NASA imposed a cost ceiling of $450 million rather than simply descoping the original SIRTF. Scientist and engineers have completely redesigned SIRTF. SIRTF is planned for launch on a delta launch vehicle during 2002. JPL was assigned responsibility for managing the SIRTF project consisting of five other partners. Each partner has it own performance measurement system that ties to an overall JPL performance measurement system. This poses a challenge to JPL to effectively manage budget and schedule. NASA has a past history of not keeping large complex projects on time and on budget. A survey should be conducted to see what controls JPL management has put in place to manage the schedule and budget of SIRTF.

Objective(s)

The audit objective will be to determine whether the SIRTIF project is effectively controlling and managing project scope, schedule, and budget and if the project is comparing cost and schedule results against valid planning data.

Mars Exploration Program, Program Planning

OIG Program Area: Audits
Potential Locations: Headquarters, JPL

In July 1994, the Mars Exploration Program Office was formed at JPL to integrate efforts in the robotic exploration of Mars. The two major elements of the program are the Mars Pathfinder and the Mars Surveyor programs. The Mars Surveyor program has a mission to conduct a 10-year series of flights and obtain a detailed understanding of Mars. The

program expanded in 1998 to include a long-term focus aimed at collecting samples during flight missions. Projected program budgets range up to $500 million annually.

Objective(s)

The audit objectives will be to assess program planning in relation to the Mars Program Strategic Plan goals. Specifically, to determine whether:

- The Mars Exploration Program Office has adequately planned to meet its strategic plan goals.
- Planned budgets are adequate to meet strategic goals.
- The Mars Exploration Program Office has adequately planned to develop the technology needed to meets its strategic goals.

Effectiveness of the New Millennium Program

OIG Program Area: Audits
Potential Locations: JPL

The New Millennium Program (NMP) was established to validate new technologies for flight programs while gathering science data. The NMP focuses on testing high-risk, advanced technologies in space with low-cost, rapid-development flights. A key element of the program is the teaming of government with industry and academia to improve America's technological infrastructure. The NMP has an annual budget of $90 million and is managed by JPL to support both Earth and space science programs. To make these flights more realistic and cost effective, each flight is equipped with science instruments that will return valuable data. Four deep space missions and two Earth science missions have been approved and additional concepts developed. The first NMP mission was Deep Space 1, which was launched during October 1998. The mission is validating a dozen technologies, including a very advanced ion propulsion system, and gathering scientific observations of various space objects along its flight path. However, the $139.5 million Deep Space 1 experienced difficulties that delayed the launch and changed its mission.

Objective(s)

The overall audit objective will be to determine whether the NMP is effectively managed to achieve the desired results. The audit will also determine whether there are lessons learned on Deep Space 1 that can benefit future NMP missions.

Astrobiology Program

OIG Program Area: Inspections
Potential Locations: Headquarters, Ames, JPL, Johnson

NASA recently instituted an Astrobiology Program. A key element of this program is the Agency's Astrobiology Institute, a partnership among NASA and research organizations to conduct interdisciplinary research in astrobiology and to train young scientists in this

new field. The over-arching theme of the organization is "life in the universe." The Astrobiology Institute (the Institute) has four major goals. Those goals are to (1) establish the new field of astrobiology; (2) help establish astrobiology science strategies for future NASA missions, (3) suggest and develop concepts for new ground-and space-based technologies to support future missions and (4) help develop the next generation of interdisciplinary scientists in the field. The Institute will be an electronic "virtual" institute comprised of universities, research organizations, and selected NASA Centers including Ames, JPL, and Johnson.

The Institute, founded in July 1998, represents the interests of and is funded by three NASA Strategic Enterprises: Space Science, Earth Science, and Human Exploration and Development of Space. Ames Research Center manages the operations of the Institute. Initially planned as a 20-year effort, NASA budgeted $9 million for the Institute's first full year of operations. Funding is expected to grow to $20 million in its second year, and may eventually reach $100 million annually.

Objective(s)

The objectives of this inspection will be to determine whether:

- NASA's Astrobiology Program is properly organized and funded.
- The Astrobiology Institute and the Strategic Enterprises are working together effectively to achieve the Agency's goals.

❖❖❖❖❖❖❖❖❖❖

II. ENTERPRISE: HUMAN EXPLORATION AND DEVELOPMENT OF SPACE

A. International Space Station

Technology Upgrades on the International Space Station

OIG Program Area: Audits
Potential Locations: Johnson

NASA used hardware and software technology that is rapidly becoming outdated to develop and operate the ISS. The computer hardware used includes 386-type processors. The computer programs (software) are written in ADA programming language (DoD Standard Computer Software Language named after Lady Ada Augusta Byron). Based on current technology, both the computer hardware and software may be obsolete before completion of the ISS. As a result, problems could arise with integration of obsolete items, performance of equipment, maintenance of equipment, and ultimately, assurance of safety.

Objective(s)

The audit objective will be to determine whether the potential risks support upgrading the ISS hardware and software before further ISS assembly because of:

- Significant problems integrating antiquated technology with any current technology.
- Safety issues to crew or property due to obsolescence.
- Performance problems because of old technology.
- Service and/or spares problem resulting from obsolete systems.

Management of Space Station Program Changes and Reserves

OIG Program Area: Audits
Potential Locations: Headquarters, Johnson

NASA uses program reserves to fund the ISS additional requirements, authorized changes, and cost overruns. The ISS Program had about $3.1 billion of program reserves in FY 1996, $2.9 billion in FY 1997, $2.3 billion in FY 1998, $1.9 billion planned for FY 1999, and $1.3 billion remaining as of March 1999. Schedule delays and realization of threats (unbudgeted cost risks) may further deplete program reserves. Because of schedule delays, full assembly of the ISS is not expected before late 2005. The schedule slip will increase program costs for sustaining engineering, logistics and maintenance and contribute towards the depletion of program reserves. Current reserve status could be further affected by additional schedule slips, contract disputes, manufacturing problems, or the need for additional testing. In addition, in the FY 2000 budget to Congress, the ISS Program Office identified $924 million in total threats. The ISS Program Office manages threats but does not budget for them. Realization of threats could further deplete Program reserves. The ISS Program Office has classified the status of program reserves as high risk. Also, the Office of Management and Budget (OMB) has expressed concern about the consumption rate of ISS Program reserves. To address the risk, the Office of Space Flight and the Space Station Program Office have formed a team to develop metrics and a process for managing ISS changes and program reserves.

Objective(s)

The overall audit objective will be to determine whether NASA is effectively managing ISS Program changes and reserves. Specifically, we will:

- Determine whether NASA's financial reserves are adequate to ensure the ISS is successfully developed and operated.
- Evaluate the effectiveness of NASA's process and metrics for managing ISS changes and Program reserves.

TABLE OF CONTENTS **PAGE**

Acquisition of Space Station Propulsion Modules

OIG Program Area: Audits
Potential Locations: Headquarters, Johnson

The ISS Control (Propulsion) Module is part of the ISS Contingency Plan, which calls for near-term reliance on Russian contributions while accelerating U.S. capabilities for long-term self-reliance. An earlier part of the plan was the development of an Interim Control Module. The Propulsion Module will provide propulsive attitude control and re-boost capability on the U.S. on-orbit segment of the ISS to augment Russian capability for the life of the ISS. NASA believes that acquiring two Propulsion Modules will remove the Russians from the critical path with respect to propulsion requirements. In June 1998, the Boeing Company proposed building two Propulsion Modules for about $300 million. The FY 2000 budget to Congress included $541 million for two Propulsion Modules, associated training, sustaining engineering, and integration costs. However, as of January 1999, the cost to produce one module had risen to about $400 million. The OMB expressed concern about the rising cost and has asked whether NASA has a strategy to cap the cost.

Objective(s)

The overall audit objective will be to determine whether NASA has developed a cost-effective acquisition strategy for long-term propulsion capability for the ISS. Specifically, we will determine whether NASA has:

- Identified and adopted the most feasible means for providing long-term propulsion capability for the ISS.
- Developed an acquisition strategy to limit the cost of the Propulsion Modules (for example, executing a firm-fixed price contract).

Government Furnished Equipment for the International Space Station

OIG Program Area: Audits
Potential Locations: Headquarters, Johnson, Contractor Locations

Government-Furnished Equipment (GFE) is any material procured by NASA from sources other than the ISS prime contractor, Boeing, and provided to Boeing for use on the ISS. That material includes such items as hardware, software, data, and others. The GFE costs for the ISS are almost $1 billion and cover large items, such as Node 2 and Node 3, as well as small items, such as crew suits, portable breathing apparatus, and data packages. The ISS program office determines whether GFE or Boeing-furnished equipment will fulfill ISS requirements. The program office's primary goal regarding GFE is to ensure the prime contractor is satisfied with the deliverables, meaning that the GFE should be delivered on schedule and should perform as designed when installed.

Objective(s)

The overall audit objective will be to determine whether the ISS program office is managing GFE effectively. Specifically, we will determine whether:

- The program office has assessed the cost-benefit of using GFE rather than Boeing-furnished equipment to satisfy ISS requirements.
- Acceptance testing is adequate to ensure that the GFE conforms to NASA quality requirements and operates as intended.
- Management controls are adequate to resolve and prevent GFE delinquencies and failures.

Software Engineering Assessment of the International Space Station

OIG Program Area: Inspections
Potential Locations: Headquarters, Johnson, Kennedy, Marshall

The ISS program involves the development of custom software as well as the use of COTS products. The software development project affects all aspects of the ISS including mission success, mission safety, costs, and schedules.

Objective(s)

The objectives of this inspection are will be to determine whether:

- The ISS program management is using proper software engineering practices in the development and management of ISS flight software and software tools.
- The quality of the software products is sufficient to support the tasks for which they are being developed.

International Space Station Customer Support

OIG Program Area: Inspections
Potential Locations: Headquarters, Johnson

The ISS will be a unique laboratory for research into the effects of microgravity and the space environment on materials, plants, and animals (including humans). It can also function as a platform for observing the Earth and space, and a test-bed for new technologies. Researchers from NASA, universities, industry, and other government agencies will use this national resource. This review will examine whether NASA is effectively minimizing procedural and other barriers that could prevent researchers from conducting ISS research in a timely and effective manner.

Objective(s)

The overall objective of this inspection will be to determine whether the ISS program is minimizing procedural and other barriers that could prevent researchers from conducting

their ISS research in a timely and effective manner. Specifically, we will determine whether:

- Researchers from universities, industry, and the government are satisfied with the procedures for manifesting experiments on the ISS.
- The Agency has an appropriate process in place to provide investigators not funded by NASA (including commercial companies) the opportunity to fly experiments on the ISS.
- Researchers will be able to fly their experiments on the ISS in a sufficiently timely manner.
- The ISS program is developing appropriate software and hardware interfaces to simplify the conduct of research on the ISS.
- Researchers have an effective "voice" in developing policies and procedures related to research on the ISS.

Assignment of Astronauts to Long-Duration Space Missions

OIG Program Area: Inspections
Potential Locations: Headquarters, Johnson

This project will build on the OIG's 1998 report "Enhancing Compatibility for Long-Duration Space Flight Crews" by assessing NASA's policies and procedures for assigning crew members to future long-duration space missions. NASA has extensive experience in conducting short duration missions (16 days or less), but the Agency's recent experience with long-duration missions is limited to stays on the Russian space station Mir. The ISS will present new challenges to NASA in terms of selecting appropriate astronaut crews to achieve crew compatibility in a relatively large multinational crew over extended periods of time.

Objective(s)

The overall objective of this inspection will be to determine whether NASA has developed an appropriate process for selecting astronaut crews for long-duration space missions. Specifically, we will:

- Assess the steps taken by Johnson to respond to the recommendations in the report: "Enhancing Compatibility for Long-Duration Space Flight Crews."
- Determine whether NASA has developed appropriate policies and procedures for selecting astronaut crews for long-duration space flights.

B. Space Shuttle

Effectiveness of Flight Readiness Review Process for the Space Shuttle

OIG Program Area: Audits
Potential Locations: Headquarters, Johnson, Kennedy, Marshall, Stennis, Contractor Sites

Space Shuttle Program (Shuttle Program) requirements and procedures for certification of flight readiness (CoFR) establish a standard approach to enable incremental review of vehicle flight preparation. The requirements and procedures are set forth in National Space Transportation System (NSTS) 08117. When program interests are best served, changes, waivers, and deviations to requirements may be obtained by submitting a change request to the Program Requirements Control Board. The CoFR includes element acceptance, payload readiness, software readiness, pre-mate milestones, ferry flight readiness milestones, flight readiness preparation and review, and flight preparation process exceptions. Those areas encompass 18 process plans identified in NSTS 08117 appendices and facilitate Space Transportation System (STS) flight concurrence by the Associate Administrator for Safety and Mission Assurance and approval by the Director of the Shuttle Program lead Center. The Program Compliance Assurance and Status System retrieves waivers, exceptions, deviations, and cannibalizations identifiable to the Operations and Maintenance Requirements System; the critical items list; launch commit criteria, and other. For example, the Program Compliance Assurance and Status System identified 621 waivers, exceptions, deviations, or cannibalizations relating to the STS-91 flight. The Shuttle Program uses the Shuttle Master Verification Plan, a test and checkout system for vehicle and payload processing for each re-flight, to identify conditions that may be considerations in the CoFR and may require resolution at the Flight Readiness Review.

Objective(s)

Our overall audit objective will be to evaluate the effectiveness of the Flight Readiness Review process. Specifically, we will determine whether:

- The Program Requirements Control Board effectively dispositions waivers, exceptions, deviations, and cannibalizations from flight to flight.
- The CoFR process appropriately balances safety requirements and streamlining.
- The CoFR Exception Forms accurately represent the Requirement/Description of Exception and that the Resolution of Exception is reasonable.
- The Shuttle Master Verification Plan effectively identifies anomalies for resolution at the Flight Readiness Review.

Commercialization of Space Shuttle and Space Station

OIG Program Area: Audits
Potential Locations: Headquarters, Kennedy, Johnson, Marshall

The Commercial Space Act of 1998 established the policy that a priority goal of constructing the ISS is the economic development of Earth orbital space. Congress declared that the use of free market principles would reduce ISS operational costs for all partners and the Federal Government's share of the United States' burden to fund operations. The use of free market principles applies to operating, servicing, allocating the use of, and adding capabilities to the ISS, and the resulting fullest possible engagement of commercial providers and participation of commercial users. Therefore, Congress tasked the NASA Administrator to deliver studies:

- On the feasibility of implementing the Commercial Space Act and that NASA transition toward the privatization of the Space Shuttle.
- To identify and examine the commercial providers' opportunities and potential cost savings they offer.
- On potential industry interest in providing commercial goods and services and updates to the cost savings and revenue estimates.

Congress also requested the Administrator to work with the Secretary of Defense to develop and report on a national mission model of the total potential space missions to be conducted by the United States.

Objective(s)

The overall audit objective will be to determine whether NASA complied with the Commercial Space Act of 1998. Specifically, we will determine whether NASA:

- Performed and delivered the studies required by the Act.
- Developed a national mission model in conjunction with the Secretary of Defense,
- Identified the resources necessary to carry out the model.
- Considered the Federal Activities Inventory Reform Act of 1998 in its response to Congress.
- Demonstrated the cost effectiveness of upgrading the Space Shuttle fleet due to interest from other government agencies, researchers, and commercial enterprises.

Audit of Space Shuttle Payloads

OIG Program Area: Audits
Potential Locations: Headquarters, Goddard, Johnson

Payloads generally are to be deployed by Expendable Launch Vehicle Service providers as that is the more economical method to deploy a payload versus the Space Shuttle.

Specific payload and payload processing characteristics must be present when using the Space Shuttle. Statutory criteria specify what can be a primary or secondary payload. The Space Shuttle limited fleet size and availability, high cost, and unique characteristics, require effective payload manifesting to minimize Agency Space Shuttle costs and to maximize Space Shuttle availability for higher priority missions.

Objective(s)

The overall audit objective will be to evaluate the effectiveness of NASA policies, procedures, and practices relative to Space Shuttle use for payload assignments. Specifically, we will determine whether NASA:

- Appropriately defines and assigns primary and secondary payloads to the Space Shuttle.
- Adequately justifies use of the Space Shuttle.
- Appropriately charges other agencies and organizations for use of the Space Shuttle.

C. Space Communications

Consolidated Space Operations Contract

OIG Program Area: Audits
Potential Locations: Goddard, JPL, Johnson, Marshall

Space Communications is experiencing major changes. Previously, NASA's space communication activities were performed by the respective Center involved with its specific function. For example, Goddard formerly handled all Earth-orbiting satellite communications under the Satellite Tracking and Data Network. However, since the Agency established the Space Operations Management Office (SOMO), all NASA communications will be handled eventually by one contractor under the CSOC.

The CSOC includes nearly all communications systems at Goddard and Marshall. The CSOC contractor manages all data acquisition including data from spacecraft, data processing and storage, ground and space communications, and mission control center operations. NASA awarded the $3.438 billion contract to Lockheed-Martin on October 1, 1998. The phase-in period ended December 31, 1998, and the basic contract amounts to $1.777 billion over 5 years. The contract also includes options totaling $1.54 billion, including a 5-year extension of the basic contract.

Objective(s)

The overall audit objective will be to determine whether the SOMO's mission goals are being accomplished. Specifically, we will determine whether the CSOC portion of SOMO:

- Meets the strategic needs of NASA enterprises consequently reducing operations costs, consolidating and integrating operations across NASA, and increasing standardization and interoperability.
- Transitions the civil service and California Institute of Technology (CalTech) work force to science research and development, except for core competencies.
- Transitions all operations contracts to performance-based contracting.
- Transitions operations functions from generating products and services to outsourcing, privatization, and commercialized services.
- Restructures management and operational processes using the concept of customer/service provider.

❖❖❖❖❖❖❖❖❖

III. ENTERPRISE: AERO-SPACE TECHNOLOGY

Aeronautics and Space Transportation

Integration and Coordination of Reusable Launch Vehicle Technology Initiatives

OIG Program Area: Audits
Potential Locations: Headquarters, Marshall

NASA's search for a space launch vehicle to replace the aging Space Shuttle is one of the Agency's highest priorities. The RLV program constitutes a major portion of this effort. One of the primary goals of the RLV program is to make an "informed decision" for proceeding with Phase III, i.e.., the development of a commercial RLV. As originally structured, the RLV program included DC-XA, X-34, X-33, multiple technology initiatives under the Advanced Space Transportation Program, and a variety of in-house and contractor work on related technologies. Recent initiatives include Future X, Crew Return Vehicle (X-38), Bantam Lifter and numerous other technology efforts that go beyond the X-33 flight demonstration program. NASA is also pursuing a "Shuttle Flyback Booster" and various other Shuttle upgrades.

Due to the number and variety of ongoing efforts, sufficient integration and coordination of these activities is essential to ensuring the overall goal of developing a next generation launch vehicle. The Administrator has stated that strategy for a next generation launch

system must include earth-to-orbit and orbit-to-orbit activities and must be a top priority for the Space Transportation Council.

Objective(s)

The audit objectives will be to determine whether NASA has:

- Identified appropriate Phase III decision criteria and ensured OMB's approval of that criteria.
- Integrated and coordinated RLV initiatives adequately to ensure their efficiency and effectiveness while avoiding duplication of effort.
- Developed and implemented an integrated strategy for developing a next generation launch vehicle.
- Established procedures to ensure efficient and effective exchange of data and technology among the various programs and projects.

Aviation Safety Program

OIG Program Area: Audits
Potential Locations: Headquarters, Ames, Dryden, Glenn Research Center, Langley

In support of the President's initiative on Aviation Safety and Security, NASA and the FAA have formed a partnership to accomplish the Aviation Safety Program. They are joined in this partnership by the aviation industry and the DoD. To support its commitment to aviation safety, NASA has reprogrammed $500 million over 5 years to be used in the Aviation Safety Program. The first goal of the Aviation Safety Program is to improve aircraft safety by reducing the fatal aircraft accident rate by 80 percent in 10 years, and by 90 percent within 20 years.

Objective(s)

The overall audit objective will be to determine whether program management is effective. Specifically, we will assess:

- The adequacy of coordination with FAA and other partners.
- The effectiveness of metrics used to determine accomplishments of the program goals.

Hypersonic Technology Program

OIG Program Area: Audits
Potential Locations: Langley

NASA established a multi-year experimental hypersonic ground and flight test program called Hyper-X. The program seeks to demonstrate "air-breathing" engine technologies that promise to increase payload capacity for future vehicles from hypersonic aircraft to

reusable space launchers. The Hyper-X Phase I Program is being conducted jointly by the Langley, the lead center and responsible for hypersonic technology development, and Dryden, which is responsible for flight research.

Phase I is a 5-year, $150 million program to flight validate scramjet propulsion, hypersonic aerodynamics, and design methods. As part of the Phase I effort, Orbital Sciences Corporation was selected to design and develop four Pegasus derivative launch vehicles. In addition, Langley awarded a $33.4 million contract to Micro Craft, Incorporated to construct the Hyper-X vehicles.

Objective(s)

The audit objectives will be to determine whether:

- Program goals are reasonable and achievable.
- Program funding is appropriate.
- Program cost and schedule is realistic and properly managed.

Advanced Space Transportation Programs

OIG Program Area: Audits
Potential Locations: Headquarters, Marshall

The Advanced Space Transportation Program (ASTP) is the technology base program developed to reduce costs and increase reliability and performance of space transportation. The ASTP program is utilizing competitive technology selection and procurement processes wherever feasible to maximize the involvement of the traditional sources of space transportation technology, as well as to bring in potential new sources. The Agency established an inter-Center process to prioritize ASTP technology investments based on their system payoff in terms of improvements in mission capability, cost, reliability, operability, responsiveness, and safety. The goals, objectives, and progress of the ASTP will be evaluated on a yearly basis by a panel of nationally recognized experts to ensure program content is consistent with government and industry priorities, and that the program is yielding the maximum possible return on the taxpayer's investment.

Objective(s)

The audit objectives will be to determine whether:

- The strategies and procedures for planning and executing ASTP technology investments and assigning priorities to them are adequate.
- Additional measures are needed to encourage industry investment.
- There are effective interfaces between the elements of ASTP.

Free Flight Program

OIG Program Area: Audits
Potential Locations: Headquarters, Ames

Free Flight is an innovative air traffic management (ATM) concept that when fully developed will allow pilots to choose their own routes, speeds and altitudes during flight. This concept would transition the air traffic system to a more advanced management utilizing digital communications, satellite navigation, and computer-aided decision support tools for controllers and pilots.

The FAA plays a major role in the development of innovative air traffic management concepts. The Associate Administrator for Research and Acquisitions provides leadership, direction, and guidance relating to FAA acquisition policy, research, system prototyping, and agency information resource management. The FAA is responsible for developing and researching air traffic management concepts. As a result, some of the Free Flight Program may be duplicating ongoing or completed existing research.

Objective(s)

The audit objectives will be to determine whether:

- NASA is duplicating existing or completed ATM research.
- NASA is adequately coordinating ATM research with airline industry partners.
- NASA methods for identifying potential ATM research areas are adequate.
- ATM research funds are being effectively utilized.

❖❖❖❖❖❖❖❖❖❖

IV. ENTERPRISE: CROSSCUTTING FUNCTIONS

A. Infrastructure and Support

1. Procurement

Subcontract Management by Major NASA Contractors

OIG Program Area: Audits
Potential Locations: Selected Centers

NASA may give contractors authority to subcontract. If given subcontracting authority, the contractor, then known as the prime contractor, prepares the solicitation, obtains vendor quotes, selects the winning vendor, negotiates the award, and monitors

performance. The NASA contracting officer may require the prime contractor to request consent before issuing subcontracts over a threshold value. To be approved, the contractor's purchasing system must ensure compliance with government subcontracting requirements and protection of NASA's interest. Government oversight of the subcontract process involves personnel from the Defense Contract Management Command (DCMC), NASA, and other agencies and aims to maintain the effectiveness of the prime contractor's purchasing system.

Objective(s)

The overall audit objective will be to evaluate subcontract management by NASA's major contractors. Specific objectives will be to determine whether:

- Contractor internal controls over the award of subcontracts are adequate.
- The contractor awarded subcontracts in a competitive manner.
- The NASA contracting officer maintained surveillance in accordance with requirements.

Contractor Quality Systems

OIG Program Area: Audits
Potential Locations: Headquarters, Goddard, Johnson, Marshall, selected Contractor Locations

NASA Procedures and Guidelines 5300.4, "Management of Government Quality Assurance Functions for NASA Contracts," sets forth requirements for NASA direction and management of Government quality assurance functions performed for NASA contracts. Quality assurance functions directly affect contract cost, delivery schedules, and contractor capability to satisfy contract technical requirements. Therefore, quality assurance activities require detailed planning and specific direction for each contract.

NASA delegates quality assurance support to the DCMC. NASA informs DCMC of its responsibilities via a Letter of Delegation or Letter of Instruction. A Memorandum of Understanding between NASA and DoD sets forth policies and procedures to reimburse DoD for contract administration and related support services. NASA spends about $35 million annually on delegated contract administration with DCMC.

Objective(s)

The audit's overall objective will be to determine whether DCMC is effectively performing delegated quality assurance activities on major NASA contracts. Specifically, the audit will determine whether NASA managers evaluate quality assurance performance to ensure that DCMC:

- Continuously reviews and evaluates the contractors' quality program and inspection system for adequate procedures and compliance.

TABLE OF CONTENTS **PAGE**

- Promptly notifies NASA of deficiencies in the contractors' quality system processes and ensures that corrective action plans are implemented.
- Assigns appropriate resources to adequately support the NASA delegation functions.
- Submits adequate reports and records to account for hours charged and charges time only against active delegations.

Health Care Costs at NASA Contractors

OIG Program Area: Audits
Potential Locations: Selected Centers

Contractors obtain employee health care coverage and bill the cost as an allowable contract charge. Health insurance costs are normally included in overhead expense pools for allocation to all benefiting cost objectives. NASA contractors bill health insurance costs to NASA as overhead costs via interim and final public vouchers and progress payment requests.

The Administrative Contracting Officer (ACO) is required by the FAR to review contractors' insurance plans. The Defense Logistics Agency (DLA) and the Defense Contract Audit Agency (DCAA) conduct joint reviews of contractors' insurance costs. DCAA provides NASA, its largest non-DoD customer, contract audit and other related audit services through formal agreements.

Objective(s)

The audit's overall objective will be to evaluate the effectiveness of DCAA oversight and any additional insight NASA may have concerning health insurance cost at major NASA contractors. Specifically, we will evaluate:

- The type of health care services provided to NASA contractors and costs related to those services.
- Whether the ACO's have requested joint reviews of health insurance costs for NASA contractors.
- Whether DCAA has performed insurance cost reviews in accordance with Agency guidance.

NASA Administration of Grants and Agreements

OIG Program Area: Audits
Potential Locations: Goddard, Johnson, Langley

NASA uses grants and cooperative agreements to acquire basic and applied research. NASA-awarded grants and cooperative agreements increased from $949.2 million in FY 1997 to $1,053.6 million in FY 1998. Use of these instruments poses several risks to NASA's business processes. Reporting requirements, deliverables, and oversight are less defined with grants and agreements than with a contract. Centers could also misuse these instruments to obtain services that should have been obtained through contract.

Objective(s)

The audit objectives will be to determine whether:

- Grants and cooperative agreements are being used to acquire contract-type services.
- Required performance reports are submitted in a timely manner.
- Research efforts met NASA's goals.

NASA Reliance on Corporate Self Governance

OIG Program Area: Audits
Potential Locations: Selected Centers

Since NASA and DoD rely on the same major contractors, NASA has adopted DoD guidelines on "Corporate Self Governance." Regarding the need to adopt corporate self governance, the Secretary of Defense has verbalized the "imperative" need for "dramatic" reform of the acquisition process to maintain technological superiority and a strong national industrial base.

Government oversight of contractors exists to protect the public interest. Contractors can achieve reduced Government oversight by implementing voluntary programs of self governance. To the extent a contractor's system can be relied upon, government oversight can be reduced commensurately. In 1996, DoD adopted Earned Value Management (EVM) procedures, in part, to bring government monitoring practices more in line with contractor management practices. In cooperation with OMB, the Office of the Secretary of Defense is working to develop performance management requirements based on earned value for non-Defense agencies.

Objective(s)

The audit objectives will be to determine:

- The extent to which NASA has Advance Agreements in place that specify that contractors will use an effective EVM System and that document the government's intent to minimize system reviews.
- Whether the Advance Agreement is executed based on prior system validation or on following the successful completion of an Initial Compliance Review, and whether it remains in effect indefinitely.
- NASA's experience to date with EVMS and whether savings and benefits can be estimated based upon that.

Contractor Performance on NASA Support Service Contracts

OIG Program Area: Audits
Potential Locations: Headquarters, Ames, Goddard, Johnson, Kennedy, Marshall selected Contractor Locations

NASA Centers use support service contracts to obtain engineering, technical, and administrative services in support of NASA programs. Contractor employees perform services specified in tasks written against the contract. Generally, the task describes the work to be performed, gives the number of hours the employee will provide, states the expected performance measure, and sets a funding limit. NASA Headquarters, Goddard, Johnson, Kennedy, and Marshall have about 109 support service contracts valued at approximately $9.5 billion.

Support service contracts are vulnerable to several misuses. Those vulnerabilities include: (1) contractor employees can be used to provide personal services, (2) contractors may inadequately control third-shift employees, (3) contractor employees can perform work below contract performance requirements, but oversight personnel have not identified the nonconforming work. Substandard or nonconforming work results in cost overruns and schedule slippage that adversely affects the NASA program relying on the support service contractor.

Objective(s)

The audit's overall objective will be to assess management of NASA's support service contracts. Specific objectives will be to determine whether:

- Contractor employees are performing personal services.
- The contractor has implemented adequate management controls to ensure effective performance by contractor employees.
- The contract includes clearly stated program and performance requirements.
- Oversight personnel adequately monitor contractor performance against requirements.
- The NASA contracting officer has maintained adequate surveillance over contractor performance.

NASA Contract Closeout Process

OIG Program Area: Audits
Potential Locations: Goddard, Johnson, Marshall

NASA Procurement Offices have traditionally placed less priority on contract closeout than pre-award or contract administration activities. However, recent NASA budget constraints have caused the Agency to review its available resources. The review has highlighted the substantial number of NASA contracts remaining open for extended

periods of time, along with their related unliquidated obligations. Also, implementation of the Integrated Financial Management Project requires closing out eligible purchase orders and contracts to avoid converting significant amounts of data and added project cost. Because timely contract closeout is beneficial, the issue and the possible use of quick closeout procedures have received increased attention.

Objective(s)

The audit's overall objective will be to evaluate NASA's efforts to close out inactive contracts. Specifically, we will determine whether:

- NASA Centers fully use quick closeout procedures.
- Actions could be taken by NASA to expedite contract closeout.
- An improvement in closeout timeliness would reduce the unliquidated obligation balance on NASA contracts.

Contract Audit Follow-up Systems at NASA Centers

OIG Program Area: Audits
Potential Locations: Selected Centers

The DCAA, other DoD components, the Department of Health and Human Services, and nonfederal auditors perform contract administration and audit services on behalf of NASA. A May 1969 agreement between the DoD and NASA established policies and procedures by which the DoD will perform contract audit services in support of NASA contracts. A Memorandum of Understanding between DCAA and the NASA OIG, dated December 1987, set forth the policies and procedures for the planning, conducting, and coordinating of audit and investigative activities at NASA's contractors and grantees. The NASA Contract Administration Services Policy Group is responsible for establishing policy and ensuring effective management of delegated contract administration and audit services.

Objective(s)

The audit's overall objective will be to evaluate the adequacy of NASA's contract audit follow-up system. Specifically, we will determine whether:

- Policies and procedures for resolution and disposition of contract audit findings and recommendations are in compliance with OMB Circular A-50 requirements.
- Follow-up activities ensure the prompt and effective resolution and disposition of contract audit recommendations, including the recording of action taken on all findings and recommendations.

Contractor Merger and Acquisition Costs Charged to NASA Cost-Type Contracts

OIG Program Area: Audits
Potential Locations: Goddard, Johnson, Kennedy, Marshall

Several major NASA contractors have undergone business consolidations, such as mergers with, or acquisitions of, another corporation. By consolidating business interests, corporations can consolidate facilities and eliminate jobs. As a result, the corporations become more cost-effective and competitive. Corporations can then pass on to the Government cost-type contracts they hold any savings realized from their consolidated business interests as a reduction in either the direct costs or the overhead rate. Generally, savings to the Government are realized through a reduced overhead rate.

In 1993, the DoD decided business consolidations reduced DoD contract costs. Therefore, DoD began paying restructuring costs on certain DoD contracts transferred from one company to another company as a result of a business consolidation. To qualify for payment, restructuring costs must comply with allowability requirements of the FAR. In addition, Congressional restrictions require projected savings to be either at least twice the amount of costs allowed or exceed allowable restructuring costs, provided the combination would preserve a critical capability.

Objective(s)

The audit's overall objective will be to assess merger and acquisition costs on cost-type contracts with major NASA contractors. Specifically we will determine whether:

- The merger or acquisition reduced NASA contract costs.
- Restructuring costs the contractor charged to NASA contracts are allowable.
- Savings from the merger and acquisition were passed on to NASA cost-type contracts.

Effectiveness of the NASA Smart Card Program

OIG Program Area: Audits
Potential Locations: Selected Centers

Smart Card is a form of Electronic Funds Transfer that performs the functions of a credit card (providing debit capabilities) and store information such as purchase history. A hardware interface can allow Smart Card usage over the Internet. In FY 1996, NASA issued 2,098 Smart Cards to selected employees to use when conducting official business. These cards accounted for approximately $36.6 million in transactions during that fiscal year. In FY 1998, the Agency issued 3,096 Smart Cards (a 47 percent increase over FY 1996) and transactions totaled $66.0 million (an 80 percent increase). With a greater

number of employees holding these cards and a wider acceptance of the cards (e.g., over the Internet), the possibility of improper or ineffective use increases significantly.

Objective(s)

The audit's objectives will be to determine whether:

- NASA has implemented the appropriate controls over the use of Smart Cards.
- Smart Cards are being used for items that could be acquired more efficiently and cost-effectively through other means such as electronic catalogs (Just-In-Time).
- Increased use of Smart Cards could result in savings to NASA.

Contractors' Use of Consultant Services

OIG Program Area: Audits
Potential Locations: Goddard, Johnson, Kennedy, Marshall

As business firms are downsizing, the use of consultant services has grown rapidly. Consultant services are considered a high-risk area of procurement. In FY's 1997 and 1998, NASA awarded to business firms $9.6 and $9.3 billion, respectively, to support research and development, services and supplies, and equipment procurements. Of those amounts, 30 percent ($2.9 billion in FY 1997 and $2.8 billion in FY 1998) was for professional, administrative, and management support services. This represents a 200 percent increase in the amount awarded for the same services in FY 1996.

Objective(s)

The audit objectives will be to determine whether NASA has adequate controls over contractors' use of consultant services. Specifically, we will determine whether:

- Management controls are adequate.
- Consulting service costs are allowable and reasonable.

NASA's Use of Just-in-Time Acquisitions

OIG Program Area: Audits
Potential Locations: Selected Centers

As a part of its Electronic Commerce activities, many NASA Centers have implemented Just-In-Time (JIT) acquisition systems to procure office supplies. The JIT is a supply concept that relies on a close relationship among the customer, the order taker, the vendor, and the deliverer. The rapid or "just-in-time" response results from the integration of all processes in the supply chain. Although not primarily a computer system, computers connect the business processes into a seamless chain.

The JIT supplements existing procurement processes to expedite the purchase of low-cost, high-volume material such as office supplies. Although individual Centers are

implementing JIT for other commodities besides office supplies, there is no NASA-wide initiative to do so. Duplication and a potential for savings exist. The benefit is lowered operations cost and reduced inventory.

Objective(s)

The audit's overall objective will be to determine whether NASA could benefit from expanding JIT acquisitions into additional procurement areas. Specifically, we will determine whether:

- Savings could be achieved by implementing JIT to acquire items such as electronic parts, office furniture, test and measurement instrumentation, and janitorial supplies.
- Benefits could be realized from acquiring shelf-life commodities such as chemical/laboratory supplies, cryogenic gasses, and photo supplies through JIT.

Multiple Award Task-Order Contracts

OIG Program Area: Audits
Potential Locations: Goddard, JPL, Johnson, Kennedy

The Federal Acquisition Streamlining Act (FASA) of 1994 authorized agency heads to enter into multiple award delivery and task-order contracts for the procurement of goods and services. Multiple award contracts occur when two or more contracts are awarded from one solicitation. The FASA mandates use of multiple award contracts for advisory and assistance services contracts exceeding $10 million and 3 years in duration.

NASA currently has approximately 14 multiple award task-order contracts. These 14 contracts have a combined value in excess of $400 million and relate to a wide range of operational and support activities such as Advanced Air Transportation Technologies and the Outsourcing Desktop Initiative (ODIN) computer support contract.

Objective(s)

The audit objectives will be to determine whether:

- NASA's use of multiple award task-order contracts is consistent with statutory requirements and in the best interest of the Government.
- NASA's management controls over use of multiple award task-order contracts are adequate.

Non-Conforming and Substandard Parts and Materials

OIG Program Area: Proactive Investigation
Potential Locations: To be determined

Many components for aerospace and support systems, including fasteners, O-rings, ball bearings, and electronic parts must be manufactured in accordance with applicable military specifications or National Aerospace Standards. Failure to comply with these standards is a continuing industry-wide deficiency and threat to mission safety. We plan to coordinate our proactive investigative efforts with other Government law enforcement resources and work to strengthen criminal sanctions against the introduction of substandard aircraft and spacecraft parts into the aerospace and defense domain.

Objective(s)

The objective of this proactive investigation will be to determine the relationship between instances of failure or defect in parts and components and the under testing, non-testing, or non-conformance of those parts to Government or contract specifications.

Contract and Subcontract Irregularities

OIG Program Area: Proactive Investigation
Potential Locations: To be determined

This project incorporates a number of proactive initiatives concerning contract fraud, which includes mischarging, kickbacks, and bid rigging. Historically, investigations have shown that the concurrent existence of cost-type and fixed-price contracts creates an environment for possible cost shifting or mischarging to the Government. This initiative may also detect lack of competition in subcontracting, potential conflicts of interest, and direct kickback relationships between prime and subcontractor employees. Review of bid and procurement files and interview of procurement officials and unsuccessful bidders would possibly identify instances where contractors have colluded to fix prices, rig bids, or allocate markets.

Objective(s)

The objective of this proactive investigation will be to identify irregularities which may be indicators of criminal activity in the area of cost mischarging, kickbacks, and bid rigging.

Health Care Fraud

OIG Program Area: Audits, Investigations, and Inspections
Potential Locations: To be determined

As the result of the indirect rates associated with contracting for health care services, NASA bears the burden of escalating health care costs. To combat rising costs associated with health care fraud, investigations, audits, and inspections will initiate a proactive project to identify these fraudulent schemes. This initiative will help detect fraudulent schemes associated with services not being rendered, upcoding (intentionally billing an insurance company for an item/service furnished under a payment code that pays a higher reimbursement to the provider), the performance of unnecessary services for billing purposes, and kickbacks.

Objective(s)

The objective of this proactive project will be to identify those areas of NASA's health care program that are vulnerable to fraud and work with the Agency to reduce those vulnerabilities.

NASA Leases

OIG Program Area: Proactive Investigation
Potential Location: To be determined

Prior work by Inspectors General and others has shown that Government contractor executives sometimes receive kickbacks and concessions for entering into property rental leases. These costs are then billed as Government contract costs. In some instances, the contractors, or shell companies controlled by them, own the properties and equipment and improperly inflate the costs of the leases. Government agencies and the contractors sometimes negotiate lease-to-own arrangements in which contractors purchase large items, such as supercomputers, and then lease them back to the agency for a period of time. After the lease expires, the Government assumes ownership of the item. In some instances, the Government has borne additional costs (i.e., interest) that would have been avoided had it purchased the item directly.

Objective(s)

The objective of this proactive investigation will be to identify improperly executed lease arrangements that have caused or could cause NASA to incur unnecessary costs.

Grants and Research Contracts

OIG Program Area: Proactive Investigation
Potential Locations: To be determined

As part of the Governmentwide focus on the integrity of Federally-funded research, this project will identify potential for research misconduct concerning grants, Small Business Innovative Research, and Small Business Technology Transfer programs. This project will attempt to detect fabrication, falsification, and plagiarism in proposing, performing, or reporting research results by universities or NASA contractors. We will focus on identifying duplicate Federal funding and subcontracting.

Objective(s)

The objective of this proactive investigation will be to examine selective grants and contracts to identify potentially fraudulent claims for work not performed.

2. Facilities and Equipment

Aerospace Test Facilities

OIG Program Area: Audits
Potential Locations: Headquarters, Ames, Dryden, Glenn Research Center, Langley

Research in aeronautics and advanced space transportation technology relies on a variety of test facilities. The facilities most frequently used in the Enterprise programs consist of wind tunnels, simulators, test beds, computational facilities, and propulsion and flight test facilities. These facilities provide part of the research and development infrastructure for the U.S. aeronautics and space community, which includes industry, government and academic researchers.

Objective(s)

The overall audit objective will be to determine whether NASA protects its national assets through a program that adequately maintains aerospace test facilities and ensures that facilities are reliable and free from significant safety problems. Specifically, we will determine whether:

- Deficiencies such as deteriorating structures or increasing test equipment breakdowns exist in NASA's aerospace test facilities and if so, the cause.
- NASA has adequately budgeted for maintenance needs and expenditures.
- NASA's institutional controls over maintenance activities are adequate to ensure that all facilities are protected against deterioration and breakdowns.

Property Management Controls—Contractor-Held Equipment

OIG Program Area: Audits
Potential Locations: Goddard, Johnson, Kennedy, Marshall

NASA accomplishes its mission extensively through the use of contractors. Often, these contractors are provided Government-owned equipment and materials by NASA and/or are allowed to acquire such personal property on the contract using NASA funds. In either case NASA, with certain exceptions, retains title or ownership of the property while in the hands of contractors. Contractors are required to report NASA-owned property in their possession on NASA Form 1018. While NASA maintains some additional control over property held by contractors located on NASA facilities, property held by off-site contractors could be at a higher risk for misuse or loss. At the end of FY 1998 contractors reported holding approximately $19.25 billion of NASA-owned personal property.

Objective(s)

The overall audit objective will be to evaluate management controls/procedures over accountability and utilization of NASA personal property held by off-site contractors. Specifically, we will evaluate the policies and controls covering:

- Property losses.
- Property accountability.
- Property utilization.
- Contractor acquisitions of property.

Mothballed/Abandoned NASA Facilities

OIG Program Area: Inspections
Potential Locations: Marshall, Wallops

Recent downsizing within NASA has resulted in the closing and abandoning of facilities at both Marshall and Wallops. If not deactivated properly, abandoned facilities not only pose safety hazards, but may also incur unnecessary maintenance costs. Additionally, Government-owned property within those facilities is subject to loss, damage, or theft if not properly processed for disposal.

Objective(s)

The objectives of this inspection/assessment will be to determine whether facilities are abandoned in accordance with NASA guidelines and whether disposal of property within those facilities is handled properly and in accordance with established regulations and guidelines.

NASA Medical Facilities

OIG Program Area: Inspections
Potential Locations: Johnson, Kennedy

Medical facilities are located at all NASA Centers. However, the greatest use by NASA personnel of these facilities occurs at Johnson and Kennedy. Prior reviews have identified management control weaknesses in the operation of the medical facilities at those locations. Also, the type of contract used to obtain medical services for those locations may not be appropriate for the services performed.

Objective(s)

The objectives of this inspection/assessment will be to determine whether internal controls for the medical facilities at Johnson and Kennedy are adequate and whether the contract for the services provided is appropriate.

Construction Inspections

OIG Program Area: Inspections
Potential Locations: Langley, selected Centers

Proper and timely inspection of construction projects is critical if NASA is to ensure the safety of its personnel and equipment.

Objective(s)

The objectives of this inspection/assessment will be to:

- Determine whether construction project inspections are conducted and documented in accordance with established regulations and guidelines.
- Assess the adequacy of the methodology employed to resolve problems identified during the inspections.

3. International Agreements

Deemed Exports of NASA Information and Technology

OIG Program Area: Audits
Potential Locations: Headquarters, selected Centers

Any release to a foreign national of technology or software that is subject to the Export Administration Regulations is "deemed to be an export" to the home country of that foreign national and is commonly referred to as "deemed exports." Technology or software is typically released for export through (1) visual inspection of U.S.-origin equipment and facilities by foreign nationals, (2) oral exchange of information in the

United States or abroad, or (3) the application to situations abroad of personal knowledge or technical experience acquired in the United States.

NASA policy states that all foreign visit requests will be screened to determine whether they comply with Agency and national policies, including U.S. national security, nonproliferation and foreign policies, and U.S. export control regulations. All NASA locations host a significant number of visits by foreign nationals each year.

Objective(s)

The audit objectives will be to determine whether NASA has appropriate policies and procedures in place to ensure deemed export licenses are acquired for foreign national visitors who will have access to data, information, or technology subject to the Export Administration Regulations. The audit will also determine whether NASA technology and information has been inadvertently exported to foreign nationals without obtaining the necessary export licenses.

4. Operations

Management of NASA's T-38 Aircraft Fleet

OIG Program Area: Audits
Potential Locations: Johnson

The T-38 is a supersonic, two-engine, two-seat jet trainer used by astronaut pilots and mission specialists to maintain their flying skills in preparation for Space Shuttle missions. In 1995, the average cost of a T-38 was $762,036. NASA has 34 T-38 aircraft. Of the 34 aircraft, Johnson owns 33 and Ames owns the other one. All of the T-38 aircraft are maintained at Johnson.

OMB Circular A-126, "Improving the Management and Use of Government Aircraft," prescribes the policies to be followed by Executive Agencies in acquiring, managing, using, accounting for the costs of, and disposing of aircraft in order to minimize cost and improve the management and use of government aviation resources. OMB also requires agencies to periodically review the continuing need for all aircraft and the cost effectiveness of their aircraft operations in accordance with the requirements of OMB Circular A-76, "Performance of Commercial Activities."

Objective(s)

Our overall audit objective will be to determine the effectiveness of NASA's management of its T-38 fleet. Specifically, we will determine whether NASA has:

- Complied with OMB Circular A-126 in managing, using, and accounting for the cost of its aircraft.
- Conducted and submitted periodic reviews for the continuing need of its aircraft and the cost effectiveness of its aircraft operations, in accordance with OMB Circular A-76.

Assistance to Entertainment-Oriented Productions

OIG Program Area: Inspections
Potential Locations: Headquarters, selected Centers

NASA receives requests to provide goods and services to motion picture, television, and video productions. The Office of Public Affairs records the number of requests and the statements supporting NASA's decision to grant or deny the requests. If NASA grants the request for assistance, the production company must reimburse NASA for all costs incurred. In addition, a reimbursable Space Act agreement must be signed, and advance payment must be received before any assistance is rendered.

Objective(s)

The objectives of this inspection/assessment will be to:

- Identify evaluation criteria used to grant a request for assistance.
- Determine whether assistance impacts other Agency operations.
- Determine whether production companies have reimbursed NASA for all costs incurred.
- Determine whether production activities complied with safety, environmental, and security standards.

NASA Badging Program and Physical Access Controls

OIG Program Area: Inspections
Potential Locations: To be determined

NASA is responsible for protecting the national assets under its control and providing adequate security to its civil service work force, contractors, partners, and visitors. Key processes in providing these protections include the policies, procedures, and practices governing access to NASA facilities and ways in which the Agency issues official badges.

Objective(s)

The objectives of this inspection/assessment will be to:

- Determine whether NASA Centers comply with Federal and NASA badging and physical access control guidelines.
- Assess whether policies and procedures are in place to adequately control access to sensitive facilities or controlled information and materials.
- Identify and share best practices, including innovative applications of security technology and effective deployment of security staff.

B. Environmental and Financial Management

1. Environmental Management

Hazardous Waste Management

OIG Program Area: Audits
Potential Locations: Ames, Kennedy, Langley, Marshall

NASA can reduce the risk of environmental harm and conserve valuable materials through an effective hazardous waste management program. Hazardous materials are used at most NASA Centers. Once they are used, these materials typically become hazardous waste subject to control under the Resource Conservation and Recovery Act (RCRA). The resulting waste is then shipped to off-site treatment, storage, and disposal facilities. Each step in the process provides opportunities for reducing environmental risks and liabilities.

Objective(s)

The audit objective will be to determine whether NASA and its contractors manage hazardous waste so as to reduce the risk for environmental harm and the resultant liability while conserving natural resources. Specifically, we will determine whether the management programs of NASA and its contractors ensure that hazardous waste is:

- Being reduced as much as possible.
- Properly managed on NASA Centers.
- Properly managed during shipment to off-site treatment, storage, or disposal facilities.
- Properly managed at these off-site facilities.

Sale of Hazardous Materials to the Public

OIG Program Area: Audits
Potential Locations: Johnson, Kennedy, Marshall

Hazardous materials are sold to the public at most NASA Centers. NASA or the General Services Administration (GSA) may conduct the sales. Materials sold include paints, solvents, paint thinners, and mercury batteries. If the buyers of hazardous materials do not properly dispose of the used or unused materials, NASA could be subject to fines, penalties, and cleanup costs. As a result, NASA should have control mechanisms that protect its interests whenever hazardous materials are sold to the public. Specifically, NASA should ensure that: (1) the buyer is aware of the hazardous nature of the material and the resulting responsibility for properly disposing of any used or unused materials, (2) all sales are coordinated through the Center's environmental office, and (3) the GSA informs the buyer of the nature of the material and resulting disposal responsibilities whenever GSA sells hazardous materials originating from NASA inventories.

Objective(s)

The audit objective will be to determine whether NASA has implemented controls over the sale of hazardous materials to the public to protect NASA's interests. Specifically, to determine whether:

- The buyer is informed of the hazardous nature of the material and resulting disposal responsibilities.
- Hazardous material sales are coordinated with the Center's environmental office.
- NASA's interests are protected when GSA sells hazardous materials for NASA.
- Sales of hazardous materials to the public should be discontinued.

Consolidation of Recycling and Waste Collection Efforts at Co-located Facilities

OIG Program Area: Audits
Potential Locations: Kennedy, Langley, Marshall, Wallops

Integrated Product Teams were previously chartered to increase DoD/NASA cooperation to achieve reductions in investment and operating costs. One of the Integrated Product Teams' recommendations resulted in a memorandum of agreement between Dryden and the Air Force Flight Test Center to combine common contractual requirements for recycling of certain waste materials. The intent was to capitalize on attendant economies of scale and to reduce administrative expenses.

The geographic locations of several NASA and DoD installations presents both NASA and DoD the opportunity to further combine resources toward recycling and waste efforts. Four NASA field installations are in close proximity, or are co-located with DoD installations: (1) Kennedy, Cape Canaveral Air Force Base, and Patrick Air Force Base;

(2) Langley and Langley Air Force Base; (3) Wallops and Navy Activities, and (4) Marshall and Red Stone Arsenal.

Objective(s)

The audit objectives will be to determine whether savings can be generated by consolidating:

- The recycling and waste prevention programs at co-located facilities.
- The recycling or waste collection contracts at co-located facilities.

Cost Sharing for Environmental Cleanup Efforts

OIG Program Area: Audits
Potential Locations: Headquarters, selected Centers

Contamination at some NASA sites may be due to the practices of past owners and operators of its facilities, of NASA contractors or tenants, or of neighboring properties. These parties, as well as NASA, may be considered responsible parties under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the environmental law that governs facility cleanup and imposes liability on responsible parties. However, CERCLA leaves the negotiation of the allocation of liability to the responsible parties involved.

A 1986 GAO study found that NASA did not have policy guidance relative to when and how to allocate cleanup costs to other responsible parties. As a result, NASA has been paying the full cost to cleanup its sites, regardless of not being completely responsible for the contamination. A previous NASA OIG audit found this to be the case, specifically at JPL, where the majority of contamination was attributable to other responsible parties. NASA finalized its guidance in this area after the prior audit was completed.

Objective(s)

The audit objectives will be to determine whether:

- NASA's current policy has been implemented in a timely manner.
- NASA has adequately justified its decisions to either pursue or not pursue other responsible parties.

RCRA Cleanup Costs

OIG Program Area: Audits
Potential Locations: Johnson, Kennedy, Michoud, Santa Susana, White Sands

NASA has identified approximately 800 environmental clean-up sites across its Centers. Several environmental laws can be applied to these sites, including CERCLA, commonly referred to as Superfund, and the RCRA. CERCLA regulates those sites that are more

serious in nature and pose a greater risk to human health and the environment. RCRA is preventative and provides a solid and hazardous waste management framework designed to prevent the addition of new sites to the Superfund cleanup list. RCRA focuses primarily on waste minimization and safe treatment, storage, and disposal of solid and hazardous wastes.

Objective(s)

The audit objectives will be to determine whether:

- Progress is being made regarding cleanup efforts at NASA's RCRA sites.
- Cleanup efforts are in compliance with requirements contained in environmental directives, orders, and other agreements.
- Environmental cleanup cost estimates are valid and supportable.
- Internal cost control measures exist to ensure that wasteful spending is not occurring in the cleanup effort.

ISO 14000 Implementation

OIG Program Area: Audits
Potential Locations: Headquarters, Kennedy, Marshall

The International Organization for Standardization created a series of environmental standards known as "ISO 14000." These standards encompass both environmental management systems and life cycle assessments. The management standards call for the creation and implementation of an environmental management system that reduces costs and liability while increasing production efficiency. While these standards are voluntary, many companies are adopting and implementing them because they provide a competitive edge. NASA is considering whether its environmental management system should become ISO 14000 certified. NASA may have to revise its current environmental management system to meet the ISO 14000 standards.

Objective(s)

The audit objectives will be to determine whether:

- ISO 14000 certification will serve NASA's interests.
- The current environmental management system meets NASA's needs.
- NASA should require its contractors to become ISO 14000 certified.

Environmental Issues

OIG Program Area: Proactive Investigation
Potential locations: To be determined

NASA is bound by NEPA and other environmental laws to consider the environment when planning any Agency action. This project incorporates proactive initiatives that will

maintain a consistent Federal enforcement presence as a deterrent to non-compliance with those laws and regulations. The initial focus will be to determine the types of environmental contaminants that are used, delivered to, and stored on NASA facilities. A system of procedures will be implemented to detect quality assurance problems so as to ensure that all technical, operational, monitoring, and reporting activities are of the highest achievable quality. Efforts will be made to identify and investigate NASA facilities and contractors that are not abiding by applicable environmental statutes. We will look for violations such as contamination of the air, ground water, or soil through improper disposal of hazardous chemicals or emissions from volatile organic compounds.

Objective(s)

The objective of this proactive investigation will be to identify contractors and facilities associated with NASA that are not in compliance with environmental laws and regulations.

2. Financial Management

Quality Control Review of NASA's Fiscal Year 1999 Financial Statement Audit

OIG Program Area: Audits
Potential Locations: Headquarters

The Chief Financial Officers Act of 1990 requires NASA to produce financial statements and the OIG to either audit or provide for an independent external auditor to audit those statements. Beginning with FY 1996, the OIG contracted with Arthur Andersen, an independent certified public accounting firm, to audit NASA's financial statements. The contract requires that the audit be done in accordance with Government auditing standards and with OMB Bulletin 98-08, as amended, "Audit Requirements for Federal Financial Statements."

Objective(s)

The objective of this Quality Control Review will be to determine whether Arthur Andersen conducted its audit in accordance with Government auditing standards and provisions of OMB Bulletin 98-08.

Performance Incentive Fees

OIG Program Area: Audits
Potential Locations: Goddard, Johnson, Marshall

Performance incentive fees, which measure hardware performance after delivery and acceptance, are fees awarded to a contractor for exceeding a standard level of

performance stipulated in the contract. NASA decided to include a performance incentive in all contracts where the primary deliverable is hardware having a total value (including options) greater than $25 million. However, a performance incentive also may be included in hardware contracts valued under $25 million. The NASA FAR supplement provides for incentive fees to be paid provisionally, before being earned. If at the end of the evaluation period the contractor received a provisional incentive fee payment more than was actually awarded, the contractor would have to reimburse NASA the overpayment. As of February 1999, NASA had 83 active incentive-fee contracts totaling $17.4 billion.

Objective(s)

The audit objective will be to determine whether NASA is complying with Federal requirements relating to provisional and advance payments for incentive fees.

Review of Carrier Account Operations

OIG Program Area: Audits
Potential Locations: Ames, Goddard, Kennedy, Langley

Carrier accounts accumulate commitments, obligations, costs, and disbursements when the benefiting programs are not known at the time the transactions are recorded. The commitments, obligations, costs, and disbursements are subsequently distributed, usually monthly, when the benefiting programs are identified. Distribution techniques from the carrier accounts are approved by the Director, Financial Management Division, NASA Headquarters. Carrier accounts require specific closeout procedures at the end of each fiscal year. Specifically, the amount not distributed to specific programs or functions rolls forward each year.

Objective(s)

The audit objective will be to determine whether carrier accounts are properly used to accumulate commitments, obligations, costs, and disbursements and distribute funds to benefiting programs.

Contract Payments Electronic Funds Transfer and Controls

OIG Program Area: Audits
Potential Locations: Goddard, Langley, Marshall

The Debt Collection Improvement Act of 1996 requires that all Federal payments, with the exception of tax refunds, will be made electronically by January 2, 1999. Recipients may seek a waiver when the cost of using electronic fund transfer for a non-recurring payment is greater than the cost of making that payment by check. NASA implemented this requirement in 1996. A comparison of vendor payments made to NASA in FY1998

showed that 166,143 (89 percent) of vendor payments were made by electronic fund transfer compared to 20,646 (11 percent) made by check.

Objective(s)

The overall audit objective will be to evaluate the internal controls associated with electronic fund transfer payments to contractors and to review compliance with existing rules and regulations. Specifically, we will evaluate:

- Significant internal controls related to contractor invoices paid by electronic funds transfer.
- The waiver process.

Review of Reimbursable Pricing

OIG Program Area: Audits
Potential Locations: Glenn Research Center, Goddard, JPL

NASA performs services for or supplies items to Federal and non-Federal entities on a reimbursable basis. NASA does not initiate work or services nor incur reimbursable obligations without a reimbursable order or agreement, a Reimbursable Agreement Number, and reimbursable funds. An estimated price report supports each reimbursable agreement. Generally, non-Federal customers are billed and pay in advance. Federal customers generally are billed and pay after the service is performed or the item delivered. Upon fulfillment of the reimbursable agreement, NASA Headquarters receives a final cost report. During FY 1998, NASA had total reimbursable costs of $715.4 million—$75.2 million from non-Federal customers and $640.2 million from Federal customers.

Objective(s)

The overall audit objective will be to determine whether NASA accurately determines and account for reimbursements. Specifically, we will determine whether:

- Reimbursable agreements are complete.
- Estimated Price Reports were accurately computed on a full-cost basis,
- Amounts due were appropriately billed and collected.
- Reimbursable data was accurately reported in the Reimbursable Obligation and Cost Reporting System.

A-133 Quality Control Reviews of Audits Performed for Non-Profit Institutions and State and Local Government

OIG Program Area: Audits
Potential Locations: Selected Certified Public Accountant Firms

The Inspector General Act of 1978, as amended, requires an agency's Inspector General to "take appropriate steps to assure that any work performed by non-Federal auditors

complies with the standards established by the comptroller General." To fulfill this responsibility, the NASA OIG conducts Quality Control Reviews of the audits performed by certified public accountants (CPA's) for non-profit institutions and state and local government organizations for which NASA has cognizance or oversight responsibilities.

Objective(s)

The audit review objectives will be to ensure that the CPAs' audit work and reports meet the applicable auditing and reporting guidance and regulatory requirements contained in:

- OMB Circular A-133 and its related Compliance Statement.
- Generally accepted government auditing standards.
- Generally accepted auditing standards.

IFMP/Security and Internal Controls Working Group

OIG Program Area: Audits
Potential Locations: Headquarters

The Security and Internal Controls Working Group (Group) was formed to address the security and internal control issues related to the configuration and implementation of the Integrated Financial Management System at all NASA Centers. The Group will be co-chaired by the Process Implementation Manager from the Integrated Financial Management Project (IFMP) staff and the Program Director for Information Assurance Audits from the Office of the Inspector General. The Group will report to the NASA Associate CFO and the NASA Assistant Inspector General for Auditing.

The Group will develop the IFMP approach to security and internal controls in concert with the appropriate functional owner policies. The guidance developed by the Group is necessary to provide interim and long-range security and internal control planning for the Integrated Financial Management System and processes. The Group will provide a forum to resolve these issues with the participation from functional managers, the IFMP staff, the NASA CIO, and the NASA OIG. The Group will be supported by the Independent Verification and Validation agent.

Objective(s)

The audit objective will be to provide an approach to the Director of the IFMP, a joint NASA/OIG approach for resolving security and internal control issues related to the implementation of the Integrated Financial Management systems and processes. This will be a continuing proactive oversight activity.

Obligations Management Validity and Timing

OIG Program Area: Audits
Potential Locations: Headquarters

NASA is required to record and report obligations promptly against applicable allotments and resources authority. The obligation must be for transactions that represent bona fide needs existing during a given period. An appropriation limited for obligation to a definite period is available only for payment of expenses properly incurred during the period of availability, or to complete contracts properly executed within that period of availability.. Goods or services required pursuant to contracts entered into or orders placed obligating a specific period for appropriation must serve a bona fide need existing in the fiscal year(s) specified by law. The balance of an appropriation or fund that has not been obligated must be returned to the general fund of the Treasury at the end of a definite period.

Objective(s)

The audit objective will be to determine whether year-end obligations are valid and proper.

3. Government Performance and Results Act

Verifying and Validating Performance Data Under the Government Performance and Results Act

OIG Program Area: Audits
Potential Locations: Headquarters, Johnson, Langley, Marshall

The Government Performance Results Act (GPRA), P.L. 103, was enacted January 1993 to improve the Federal Government responsiveness to the needs of the American public and to reduce waste and efficiency in Federal programs. The Results Act requires each executive agency to develop and prepare (1) a multi-year Strategic Plan, (2) an annual Performance Plan, and (3) and an annual Performance Report. The Performance Plan must provide a basis for comparing actual results with the established performance goals and must describe the means to be used to verify and validate the performance data used. In October 1998, the Congress separately requested the Inspectors General to assess the adequacy of controls for ensuring that the performance data included in the annual Performance Report are accurate and reliable.

Objective(s)

The overall audit objective will be to perform the work requested by Congress related to providing assurance that data used in NASA's GPRA Performance Report are reliable. Specifically we will:

TABLE OF CONTENTS **PAGE**

- Identify, for selected performance goals and measures, the source(s) of data used to compare and report actual versus planned performance.
- Determine the controls that were established, or the other actions that were taken, to ensure the data for the selected measures were accurate and reliable.
- Evaluate, through independent testing or other means, the adequacy of the controls that were established and the other actions that were taken.

C. Information Technology

1. Information Assurance

Operating System Controls in Major NASA Information Systems

OIG Program Area: Audits
Potential Locations: Headquarters, Ames, Glenn Research Center, Goddard, JPL, Johnson, Kennedy, Marshall

Operating systems support the concurrent use of a system by more than one user. While an operating system represents only a small portion of the total universe of software that may run on a particular system, it controls access to a system's resources. Other software running on the system requests access to computer resources through the operating system. Software security considerations must therefore focus on making the operating system secure. Their design generally includes capabilities to protect computing activities of one user from inadvertent or intentional interference from another. Operating system vendors place responsibilities on NASA for implementing controls to ensure that system integrity is effective and existing operating system controls are not compromised.

Objective(s)

The audit objective will be to determine whether the operating system environment has been configured and implemented to provide an appropriate level of security and integrity.

Database Controls in Major NASA Information Systems

OIG Program Area: Audits
Potential Locations: Headquarters, Ames, Glenn Research Center, Goddard, JPL, Johnson, Kennedy, Marshall

NASA uses database systems to generate, manipulate, and store information in its major computing environments. Data and related information stored in databases is one of the Agency's most important tangible assets. Security and integrity controls in database systems are critical to ensuring that data and information can be relied upon. Therefore, systems must have adequate security to prevent the unauthorized modification and disclosure of database contents. Databases must also have effective audit capabilities for detecting and reporting changes or attempted changes to the database structure, connect operations, and any sensitive database administrator privileges. Because databases are often used in a distributed environment, there are more possibilities for database failure. Consequently, adequate database recovery capabilities must also be available.

Objective(s)

The audit objective will be conducted to determine whether database security and integrity controls have been adequately implemented in the major systems selected for audit.

Network Controls in Major NASA Information Systems

OIG Program Area: Audits
Potential Locations: Headquarters, Ames, Glenn Research Center, Goddard, JPL, Johnson, Kennedy, Marshall

NASA uses network technology to communicate and transmit data and information processed by its computer systems. Errors in transmission can occur as a result of line interference or equipment failure. Data transmitted over a network can be intercepted or compromised by an unauthorized intruder. Therefore, if data and information are to be reliable, adequate network administration and security controls (both physical and logical) must be in place.. NASA uses several classifications of networks. These include local area networks (usually connecting several small computers within a small distance), wide area networks, and the Internet (connecting NASA to other public networks). Adequate security controls, such as encryption, access control, traffic control, and authentication must be in place.

Objective(s)

The audit objective will be to determine whether controls in the network environment are adequate to protection against unauthorized access and transmission risks.

Systems Development—Checkout and Launch Control System

OIG Program Area: Audits
Potential Locations: Kennedy

Kennedy's existing Launch Processing System supports the Shuttle Program with 1970's technology, which has been found to have reliability problems and growth limitations. Following studies conducted in 1996, NASA decided to fund a new system to be known as the Checkout and Launch Control System. This new system has an aggressive, 5-year schedule and will require a complete review of the functional requirements of hardware, system software, and end user application software. A unique project management approach is being used to deliver the system in 10 incremental deliveries, one every 6 months. The project is scheduled for completion in 2003.

Objective(s)

The audit objective will be to evaluate internal control issues in all critical phases of the migration life cycle, and provide management with timely feedback. Specifically, we will evaluate control issues associated with:

- Project management.
- Systems requirements definitions for real-time processing, the business and information network, the shuttle data center, and simulation systems requirements.
- Security architecture and requirements.
- Testing and implementation of application software and system software.

Hard Drive 99: Clearing of Information from Excessed Computers

OIG Program Area: Inspections
Potential Locations: Headquarters, Ames, Goddard

In FY 1997, the IAIA staff conducted unannounced "spot" checks at two NASA Centers of microcomputers that had been declared excess property. The inspection team found licensed/copyrighted software and user data on hard drives that were awaiting shipment to various addressees external to NASA. As a result of our findings and recommendations, NASA management instituted new policies and procedures and emphasized compliance with existing guidelines.

Objective(s)

The objectives are to:

- Determine whether licensed/copyrighted software and controlled data is properly cleared from microcomputer equipment ready for property disposal.
- Evaluate the compliance with, and effectiveness of, revised procedures and techniques for clearing information from computer hard drives.

Information Technology Security and Export Controls at NASA Institutes

OIG Program Area: Inspections
Potential Locations: Headquarters, Ames, Goddard, Johnson

NASA research institutes, such as the Goddard Institute for Space Studies, the Biomedical Research Institute, and the Astrobiology Institute, exchange information with external customers and cooperative centers. The highly publicized concerns regarding the theft of sensitive information from Department of Energy laboratories emphasize the need for NASA to review Agency IT Security as it relates to NASA's export control procedures for sensitive information and research data.

Objective(s)

The objectives of this inspection/assessment will be to:

- Determine whether NASA has implemented appropriate IT Security procedures at NASA research institutes and has taken the steps necessary to protect sensitive and classified information controlled by those institutions.
- Determine whether NASA has addressed IT Security as it relates to export control issues and implemented appropriate procedures at NASA institutes.

Information Technology Security Staff Qualifications and Experience

OIG Program Area: Inspections
Potential Locations: Headquarters, Ames, Langley, and selected Federal Security Activities

IT Security (ITS), or Communications and Computer Security is not currently recognized as a civil service job series. Consequently, many of the civil servants within NASA who have job-related responsibilities in this specialty are performing them as additional duties. Moreover, the personnel who are assigned these duties come from diverse backgrounds that may have no relationship to IT, communications, or computer security.

Objective(s)

The objective of this inspection/assessment will be to determine the minimum training, qualifications, and experience necessary to perform ITS functions.

International Space Station Program Implementation of Communications Security and Automated Information Security Measures

OIG Program Area: Inspections
Inspection Locations: Headquarters, Goddard, Kennedy, Marshall

NASA has been working to reduce identified communications security risks of the planned command and control uplink for the ISS. Nationally sanctioned protection techniques are required to ensure authenticity of commands, and to protect against electronic "spoofing." For the past several years the National Security Agency Information Systems Security Organization has been providing technical advice and assistance to resolve the space COMSEC issues as well as respond to a growing number of ISS-related Automated Information Security (AIS) topics.

Objective(s)

The objective of this inspection/assessment will be to determine whether NASA management has accurately identified COMSEC and AIS requirements necessary for mission assurance and safe ISS operation.

NASA's Compliance with the National Policy on the Application 0f Communications Security to U.S. Civil and Commercial Space Systems (NTISSP No. 1)

OIG Program Area: Inspections
Potential Locations: Dryden, Goddard, JPL, Johnson, Wallops, White Sands

In January 1996, the NASA Chief Information Office in collaboration with the NASA Security Management Office issued a letter, "Clarification of NASA Policy on the Application of Communications Security to Space Systems." The letter was issued in response to concern over increasingly hostile and sophisticated break-ins and attempted penetrations of NASA's AIS and telecommunications networks. This area warrants increased emphasis as NASA plans to use the Internet for commanding. Additionally, adequately secured radio frequency-based communications are crucial for command and control to protect against unauthorized commanding and "spoofing" of NASA spacecraft.

Objective(s)

The overall objective of this inspection/assessment will be to determine whether NASA's application of COMSEC to its AIS, telecommunications and spacecraft commanding systems complies with national policy and adequately safeguards those systems.

NASA Program Information Technology Security Integration Requirements

OIG Program Area: Inspections
Potential Locations: Ames, Goddard, JPL, Johnson, Marshall

Experience has shown that NASA faces a growing number of technical threats. However, security requirements such as provisions for communications and computer security are generally not included in the Program Commitment Agreement phase or the Non-Advocate Review process of NASA programs as outlined in NASA Handbook 7120.5. Not addressing security measures such as the need to protect the command/control communications uplinks of NASA space systems may cause NASA to incur unnecessary costs and an unacceptable level of risk.

Objective(s)

The objective of this inspection/assessment is to determine whether NASA is in compliance with applicable ITS statutes and regulations and has applied prudent ITS safeguards.

TABLE OF CONTENTS **PAGE**

2. Information Technology Program

Certificate Management

OIG Program Area: Audits
Potential Locations: Headquarters, Ames

NASA is developing and deploying an Agencywide, public key infrastructure. This infrastructure will use public key cryptographic technologies to secure the Agency's unclassified but sensitive electronic information. A critical component of the public key infrastructure is the central certification authority located at Ames Research Center. The certification authority is an entity that issues, signs, and manages public key certificates. The certification authority will issue user certificates to all NASA employees and contractors on an as-needed basis. The certification authority will also issue cross-certificates to certification authority's operated by other Federal and state agencies, contractors, suppliers, and customer organizations as-needed to support NASA business processes. The secure operation of the certification authority is crucial to NASA's public key infrastructure.

Objective(s)

The audit objective will be to evaluate the adequacy and effectiveness of internal controls established for the Agency's central certification authority.

Information Technology Acquisitions

OIG Program Area: Audits
Potential Locations: Selected Centers

The Clinger-Cohen Act of 1996 (Clinger-Cohen), formerly the Information Technology Management Reform Act, fundamentally changed the way Executive agencies acquire and manage IT. Clinger-Cohen introduced an acquisition process designed to reduce risks and maximize net benefits of major IT acquisitions. IT acquisitions should be aligned with strategic and tactical IT goals of the agency over the long term. NASA also requires its contractors to comply with applicable IT laws, regulations, policies, and other guidelines. NASA's IT budgets in FY's 1999 through 2003 range from about $1.4 to $1.6 billion. More than $1.0 billion of the annual IT budget will be spent on contracts.

Objective(s)

The audit objectives will be to determine whether NASA is meeting applicable IT requirements. Specifically, we will determine whether:

- IT requirements included in NASA contracts are current, complete, and accurate.
- Contractors are complying with IT requirements.
- NASA is adequately overseeing the IT requirements process.

Telecommunications Management

OIG Program Area: Audits
Potential Locations: Goddard, Johnson, Marshall, Stennis

The NASA Chief Information Officer is the principal advisor to the NASA Administrator and other senior NASA officials on information technology plans, policies, standards, investments, and assessments. In FY 1999, NASA estimates that it will invest approximately $1.63 billion in IT to support space exploration, science, and technology goals. About $305 million of those estimates is to support institutional IT, which includes telecommunications. Telecommunication services, including voice, data, and video information technology, are or will be provided to NASA Centers as part of the ODIN for NASA. ODIN is intended to develop a long-term outsourcing arrangement with the commercial sector.

Objective(s)

The overall audit objective will be to determine whether NASA's telecommunication services are effectively and efficiently managed. Specifically, we will determine whether management controls are adequate regarding the use of telecommunication services.

Next Generation Internet

OIG Program Area: Audits
Potential Locations: Ames

The main goal of the Next Generation Internet (NGI) is to assure continuing U.S. technological leadership in communications through research and development that advances the leading edge of internet working technologies and services. The NGI initiative is a multi-agency (NASA, DoD, Department of Energy, National Science Foundation, and the National Institute of Standards and Technology) Federal partnership with industry and academia to develop, test, and demonstrate significantly higher performance networking technologies and systems. This initiative is important to NASA because NASA missions require the interconnection and integration of its unique resources. NASA has budgeted approximately $25 million for NGI from FY 1998 through FY 2000.

Objective(s)

The overall audit objective will be to determine whether the NGI project objectives, milestones, and performance measures are being achieved; and the partner relationship with the NASA Enterprises, NASA Centers, other Federal agency NGI partners, industry, and academia is effective.

Presidential Decision Directive 63

OIG Program Area: Audits
Potential Locations: Headquarters, selected Centers

On May 22, 1998, the President issued the Critical Infrastructure Protection Presidential Decision Directive (PDD-63) which ordered the strengthening of the nation's defenses against emerging unconventional threats to the United States including terrorist acts, weapons of mass destruction, assaults on our critical infrastructures, and cyber-based attacks. The directive calls for a national-level effort to assure the security of the increasingly vulnerable and interconnected infrastructures of the United States. Infrastructures include telecommunications, banking and finance, energy, transportation, and essential government services.

A major component of the directive involves the development and implementation of a plan by each department and Agency of the Federal Government to protect its own infrastructure, including cyber-based systems. NASA's Chief Infrastructure Assurance Officer is responsible for overseeing the protection of the Agency's physical infrastructure assets and interdependencies; the Chief Information Officer is responsible for overseeing the protection of the Agency's cyber infrastructure assets and interdependencies.

Objective(s)

The overall objective of the audit will be to determine whether NASA has developed and implemented a plan for protecting the Agency's cyber infrastructure assets and interdependencies. Specifically, we will determine whether NASA has:

- Developed a critical infrastructure protection plan consistent with the requirements of PDD-63.
- Implemented the plan in an effective and efficient manner.

NASA's Communications Security Program

OIG Program Area: Inspections
Potential Locations: Goddard, Johnson, Kennedy

The application of appropriate levels of Communications Security (COMSEC) to NASA's telecommunications and flight communications systems is critical to the success and safety of NASA's missions. Critical elements to the success of the COMSEC program are the safeguards and controls afforded to cryptographic keying material. The cryptographic security of transmitted information is based primarily upon the proper use of uncompromised keying material.

Objective(s)

The overall objective of this inspection/assessment will be to determine whether NASA's COMSEC program and its associated organizational structure are adequate to ensure compliance with nationally mandated COMSEC policy.

The Jet Propulsion Laboratory's Implementation of NASA's Communications Security Policy

OIG Program Area: Inspections
Potential Locations: Goldstone, JPL

JPL is designing a growing number of NASA spacecraft and providing operational command and control communications for them. Aside from power, command and control are the most critical aspects of spacecraft operations. To ensure that NASA space flight programs are adequately addressing security issues, in January 1996, the NASA Chief Information Office in collaboration with the NASA Security Management Office issued a letter, "Clarification of NASA Policy on the Application of Communications Security to Space Systems."

Objective(s)

The objective of this inspection/assessment will be to evaluate JPL's compliance with NASA's policy on the application of COMSEC to space systems.

California Institute of Technology/Jet Propulsion Laboratory Design of Global Positioning Satellite Receivers

OIG Program Area: Inspections
Potential Locations: Goddard, JPL

Scientists at JPL are designing Global Positioning Satellite (GPS) receivers for use in 21 new satellites. Some of these satellites are being sold to foreign countries. The DoD is concerned that as a result of satellite signaling design modifications made by the JPL scientists, the L-2 signal normally restricted for those customers with the required COMSEC may become available to others who do not have COMSEC.

Objective(s)

The objective of this inspection/assessment will be to determine whether NASA is in compliance with applicable statutes and regulations and assures adequate safeguards are applied to the design and export of GPS receivers.

D. Safety and Technology

1. Safety

NASA Safety Reporting System

OIG Program Area: Audits
Potential Locations: Headquarters, selected Centers

The NASA Safety Reporting System (NSRS) is a confidential, voluntary, and responsive reporting channel for NASA employees and contractors to provide timely notification to NASA safety officials concerning safety hazards affecting any NASA-related activity. The NSRS supplements standard safety reporting channels by allowing for the confidential reporting of safety concerns. Although NASA and contractor employees are encouraged to use the standard reporting mechanisms available at their work sites to report safety concerns, the NSRS is available (1) if no action is taken on the reported concern; (2) an individual is dissatisfied with the action taken; or (3) extenuating circumstances, such as fear of reprisals, prevent an individual from using standard reporting channels.

Objective(s)

The audit objectives will be to determine whether:

- The NSRS is an effective tool for surfacing NASA safety concerns to the appropriate authorities.
- An effective process is in place to ensure safety concerns reported through the NSRS are appropriately addressed and dispositioned.
- There is independence among the personnel responsible for the resolution process.

Safety Process for Space Station International Partners

OIG Program Area: Audits
Potential Locations: Headquarters, Johnson, NASA Foreign Locations

NASA will construct the ISS in partnership with the Russian Space Agency, European Space Agency, Canadian Space Agency, and the National Space Development Agency of Japan. The Memorandum of Understanding between the partners for construction of the ISS states that NASA will establish the overall safety and mission assurance requirements for the ISS and that the international partner's contributions to the ISS will meet those requirements. NASA is also responsible for conducting safety reviews and the partners are required to participate in and support the reviews. When a particular ISS safety requirement cannot be met, a waiver or deviation is required.

Objective(s)

The objectives of the audit are to determine whether:

- The components of the ISS provided by foreign partners meet NASA safety requirements.
- NASA has conducted the required safety reviews of the international partners.
- Safety waivers and deviations are properly documented and approved.

Safety and Mission Success Planning/Risk Assessment

OIG Program Area: Audits
Potential Locations: Headquarters, selected Centers

Risk management is a continuous process that identifies risks, analyzes their impact, and prioritizes them. Risk management develops and carries out plans for risk mitigation, acceptance, or other action. NASA policy is to maximize the likelihood of mission success by using qualitative or quantitative risk assessment techniques to identify and understand the risks, take appropriate steps to control or mitigate the risks, and then accept only reasonable and appropriate levels of residual risk before proceeding with a mission. The NASA Office of Safety and Mission Assurance (OSMA) is responsible for conducting oversight and independent assessments to ascertain that appropriate risk management practices are used.

Objective(s)

The objectives of the audit are to determine whether:

- NASA programs and projects are in compliance with the risk and safety assessment requirements of the NPG 7120.5A.
- The NASA OSMA is providing oversight, including performing independent assessments to ascertain whether programs/projects are using appropriate risk management practices.
- Programs/projects are appropriately addressing recommendations from the independent assessments.

Flight Range Safety for NASA-Sponsored Tests (X-33, 34)

OIG Program Area: Audits
Potential Locations: Headquarters, Dryden, Marshall, selected Contractor Locations

NASA's RLV program includes a series of flight demonstrators including the X-33 Advanced Technology Demonstrator and the X-34 Technology Testbed demonstrator. The first flight of the X-33 is tentatively planned for July 2000. The flight test program will be conducted between the launch site at Edwards Air Force Base (AFB) in California and landing sites at Malstrom AFB, Montana, and Dugway Proving Ground, Utah. The

first flight of the X-34 is planned for late 1999. The X-34 flight test program will be conducted at Edwards AFB, and Holloman AFB, White Sands Test Facility, and White Sands Missile Range in New Mexico.

Objective(s)

The audit objective will be to determine whether flight range safety requirements have been appropriately considered and addressed prior to commencement of the X-33 and X-34 flight test programs. The audit will also evaluate the extent of NASA's participation in the safety planning for flight tests conducted at non-NASA locations.

Quantitative Risk Assessment System

OIG Program Area: Audits
Potential Locations: Headquarters, Johnson

In 1996, the Associate Administrator, Office of Safety and Mission Assurance, and the Space Shuttle Program Manager initiated a project to develop a model for quantitatively assessing risk to the Space Shuttle. This project resulted in the development of a PC-based software tool, known as Quantitative Risk Assessment System (QRAS), for conducting quantitative risk assessment, together with a quantified Space Shuttle risk model. The combination of QRAS and the risk model can be used to calculate the change in the probability of catastrophic failure of the Space Shuttle as a result of proposed upgrades.

Objective(s)

The audit objectives will be to determine:

- Whether the data provided by the QRAS is accurate, reliable, and beneficial for the purpose of assisting NASA Space Shuttle Managers in making critical program decisions.
- The extent to which NASA managers use QRAS data when making decisions concerning Space Shuttle safety and performance upgrades.

Safety Reviews of Selected NASA Contractors

OIG Program Area: Audits
Potential Locations: Headquarters, selected Contractor Locations

NASA contractors are required to follow NASA safety policies and procedures to the extent specified in their respective contracts. Typically, NASA contractors are required to take reasonable safety and health measures in performing their work. Contractor's are required to comply with all Federal, state, and local laws applicable to safety and health in effect on the date of the contract and with the safety and health standards, specifications, reporting requirements, and provisions set forth in the contract schedule.

Authorized Government representatives are responsible for ensuring that contractors are reviewed and evaluated for compliance with the contract's safety provisions.

Objective(s)

The audit objectives will be to determine whether:

- Contractor safety programs are being adequately assessed as part of the pre-award procurement process.
- NASA contracts contain appropriate safety clauses.
- Contractor operations are appropriately reviewed and evaluated for compliance with the contract safety provisions and good safety practices.

Satellite Failures/Malfunctions

OIG Program Area: Inspections
Potential Locations: Headquarters, Goddard, JPL

Recently NASA has experienced several satellite failures and malfunctions, such as SOHO, NEAR, Wire, Terriers. Many of the satellites were developed under the Agency's "faster, better, cheaper" model.

Objective(s)

The objectives of this inspection will be to determine whether:

- NASA has identified systematic reasons for recent satellite failures and malfunctions.
- NASA has taken appropriate corrective actions to decrease the risk of future failures or malfunctions.
- The "faster, better, cheaper" model provides for sufficient worker skill mix, sufficient backup/redundancy, and schedule impact in the development of satellites.

Safety Clearance Procedures

OIG Program Area: Inspections
Potential Locations: Langley, selected Centers

NASA's safety program helps ensure employees a safe and healthful working environment that is free from unacceptable hazards, which could result in property damage, injury, or loss of life. A key component of the safety program is the safety clearance procedure, also known as the "red tag" system. During a safety clearance procedure, personnel hang a red tag on equipment being installed, maintained, or in any situation where an equipment configuration must be temporarily maintained to protect equipment and personnel. In 1998, the Occupational Safety and Health Administration "strongly recommended" Langley update its policy to include lockout in its safety clearance procedure. Lockout involves installing a device that ensures the equipment

cannot be operated. In March 1999, Langley augmented its safety clearance procedure by adding the requirement that lockout devices be used.

Objective(s)

The objectives of this inspection/assessment will be to determine whether:

- An effective safety clearance procedure, using lockout, has been established and administered.
- Personnel are properly trained in the safety clearance procedure.

Health Reports by Flight Crews

OIG Program Area: Inspections
Potential Locations: Headquarters, Johnson

Health reports filed by flight crews aboard the ISS and the Shuttle contain vital information on the health of crews throughout their missions as well as conditions aboard the spacecrafts. The health reports are also an integral component of the conduct of life and microgravity experiments during missions.

Objective(s)

The objectives of this inspection will be to determine whether appropriate reporting mechanisms are in place for adequate communication between flight crews, principal investigators performing experiments, and medical officers monitoring crews to ensure:

- Accurate science.
- Crew safety and health.

2. Technology

Strategic Enterprise Technology Programs

OIG Program Area: Audits
Potential Locations: Headquarters, selected Centers

NASA's new approach to technology hinges on a capability to continually and rapidly explore the effects of new technology and advanced concepts on potential missions, both to guide advanced technology investments and to determine when critical technologies are mature enough to allow a desired mission to be undertaken with acceptable programmatic risk. The NASA Strategic Plan provides the Agency's vision of the future and defines how the Strategic Enterprises contribute to accomplishing that vision. The Enterprises are responsible for formulating and implementing technology programs in support of the Strategic Plan and consistent with the broad policy and guidelines provided by NASA's Technology Leadership Council.

Objective(s)

The audit objective will be to determine whether the technology program of individual Strategic Enterprises is properly aligned with the goals and objectives of the Strategic Plan and the NASA Technology Plan. Specifically, the audit will determine whether the Strategic Enterprises are properly allocating funding for technologies that will help achieve strategic goals and objectives.

Engineering Research and Technology Development on the International Space Station

OIG Program Area: Audits
Potential Locations: Headquarters, Johnson

The space environment can be very difficult to simulate on Earth and much research and development activity can only be performed in space. Consequently, the ISS will be a valuable asset for in-space engineering research and technology. The National Research Council issued a report concluding that the ISS could be used for significant engineering research and technology development in numerous areas, such as advanced solar power systems, robotic systems, life-support systems, fluid transport and structural dynamics. The Council recommended nine specific actions to ensure the ISS is effectively used for engineering research and technology development.

Objective(s)

The audit objective will be to determine whether NASA has implemented the National Research Council recommendations for using the ISS for engineering research and technology development activities.